REMARKS

Claims 1, 3, 5, 6, 8 and 10 are pending in the application. Claims 2, 4, 7 and 9 were previously canceled.

The drawings are objected to by the Examiner. Figures 3A-9B are amended to more clearly show the characters and symbols in each figure.

The specification is objected to for various informalities. The specification is amended to overcome the Examiner's objections. In particular, Tables 1 and 2 are replaced with tables having formulae and numbers that are more clearly presented. No new matter was included in the specification as a result of these amendments.

Claims 1, 3, 5, 6, 8 and 10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement, and under 35 U.S.C. 112, second paragraph, as being indefinite. Claims 1, 3, 6 and 8 are amended to overcome these rejections. Applicant respectfully requests that the section 112 rejection of claims 1, 3, 5, 6, 8 and 10 be reconsidered and withdrawn.

Claims 1, 3 and 5 are rejected under 35 U.S.C. 102(b) as being unpatentable over U.S. Patent No. 5,808,463 to Nagano, hereinafter "Nagano", in view of U.S. Patent No. 6,104,764 to Ohta et al, hereinafter "Ohta". Claims 1 and 3 are independent. Applicant respectfully traverses this rejection.

Claim 1 provides a vector-detecting apparatus that detects an in-phase component and a quadrature-phase component of a pre-determined frequency signal. The apparatus includes a first filter, and a second filter whose impulse response is orthogonal to said first filter. An output of the first filter is regarded as the in-phase component of the pre-determined frequency signal, and an output of the second filter is regarded as the quadrature-phase component of the pre-determined frequency signal. An impulse response of the first filter is weighted by a sine function of the frequency of

the pre-determined frequency signal, and an impulse response of the second filter is weighted by a cosine function of the frequency of the pre-determined frequency signal. The first filter and the second filter are digital filters.

Nagano discloses a measurement apparatus for measuring a leakage power of an adjacent channel of a transmitting channel, of a device under test (DUT) 1 (col. 4, lines 63-67). The DUT 1 produces a transmitting signal, and measurement apparatus executes a complex FFT (fast Fourier transformation) using a digital signal processor (DSP) 4 to measure the adjacent channel power (col. 5, lines 1-5).

DSP 4 performs digital signal processing for a digital signal 211 supplied from an A/D convertor 3 (col. 5, lines 17-19). Within the DSP 4, a quadrature detector (orthogonal detector) 400 performs quadrature detection of signal 211 and outputs an in-phase component I and a quadrature component Q, and digital low-pass filters 405 and 406 remove the high frequency components from the in-phase component I and the quadrature component Q (col. 5, lines 30-37). Within the quadrature detector 400, signal generators 402 and 404 and multipliers 401 and 403 are provided (col. 5, lines 53-54). The generators 402 and 404 generate digital values of a cosine signal and a sine signal every sampling, respectively, the cosine and sine signals having a same frequency f_H (col. 5, lines 54-57). The multipliers 401 and 403 multiply the cosine signal and the sine signal with the digital signal 211 supplied to the quadrature detector 400, respectively (col. 5, lines 57-60). An output signal 212 of the multiplier 401 indicates the in-phase component and is input to the low-pass filter 405, and an output signal 213 of the multiplier 403 indicates the quadrature component and is input to the low-pass filter 406 (col. 5, lines 60-64).

Nagano discloses extraction of the in-phase and quadrature components of a signal. Nagano merely discloses two filters, a first of which receives an in-phase component and a second of which receives a quadrature component. However, Nagano does not disclose filters having a fixed impulse response relative to one another. Indeed, the impulse responses of the filters are not specified in Nagano. As is

known in the art, each filter in Nagano can filter each input signal without the necessity of an orthogonal relationship between each filter's impulse response. Therefore, **Nagano does not disclose or suggest two filters having impulse responses that are orthogonal to one another**. Therefore, Nagano does not disclose or suggest "a first filter; and a second filter whose impulse response is orthogonal to said first filter," as recited in claim 1.

Ohta discloses a receiving apparatus including an I-axis-component separating circuit 10 and a Q-axis-component separating circuit 11, to which a digitized signal is supplied (col. 12, lines 60-63). A sampling output is obtained for every other clock pulse in the I-axis-component separating circuit 10, while in the Q-axis-component separating circuit 11 a sampling output is obtained at time points when a sampling output is not obtained in the I-axis-component separating circuit 10 (col. 12, line 64 – col. 13, line 1). The polarity of the sampling output is inverted for every other clock pulse with respect to each of the I-axis and the Q-axis to effect Hilbert transform, thereby transforming the sampling outputs into the form of two orthogonal components on a phase plane (col. 13, lines 1-6). These two signals are supplied to a complex coefficient filter 12, and its orthogonal outputs 13 and 14 are fed to an I-axis equalizer 15 and a Q-axis equalizer 16, respectively, where the phase delays are equalized (col. 13, lines 6-11). Outputs 17 and 18 of the I-axis equalizer 15 and the Q-axis equalizer 16 are fed to an I-axis lowpass filter 19 and a Q-axis lowpass filter 20, respectively, to eliminate undesired, high-frequency residual components (col. 13, lines 11-15).

Ohta discloses a signal receiving apparatus including an "I-axis lowpass filter" that receives an I-axis component of a signal, and a "Q-axis lowpass filter" that receives a Q-axis component of a signal. However, **Ohta does not disclose or suggest that the filters have impulse responses orthogonal to one another**. The output signal of each filter is dependent on the component of the signal that was inputted through the separating circuits and other components, not on the impulse response of each filter. Therefore, Nagano does not disclose or suggest "a first filter; and a second filter whose impulse response is orthogonal to said first filter," as recited in claim 1.

Thus, Nagano and Ohta, whether considered alone or in combination, do not disclose or suggest the elements of claim 1. Accordingly, claim 1 is patentable over the cited combination of Nagano and Ohta.

Claim 3 includes recitals similar to claim 1. For at least reasoning similar to that provided in support of the patentability of claim 1, claim 3 is patentable over the cited combination of Nagano and Ohta.

Claim 5 depends from claim 3. For at least reasoning similar to that provided in support of the patentability of claim 3, claim 5 is patentable over the cited combination of Nagano and Ohta.

For the reasons set forth above, it is submitted that the rejection of claims 1, 3 and 5 under 35 U.S.C. 103(a) as unpatentable over Nagano in view of Ohta is overcome. Applicant respectfully requests that the rejection of claims 1, 3 and 5 be reconsidered and withdrawn.

Claims 6, 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagano and Ohta in view of U.S. Patent No. 4,888,701 to Wakasugi et al., hereinafter "Wakasugi". Claims 6 and 8 are independent. Applicant respectfully traverses this rejection.

As described above in the discussion of claim 1, Nagano and Ohta do not disclose or suggest an apparatus having a first and second filter, "a first filter; and a second filter whose impulse response is orthogonal to said first filter," as recited in claim 1. Thus, neither Nagano nor Ohta discloses or suggests the elements of claim 1.

Applicant does not believe that Wakasugi makes up for the deficiencies of Nagano and Ohta, as they apply to claim 1. Accordingly, Applicant submits that claim 1 is patentable over the cited combination of Nagano, Ohta and Wakasugi.

Claims 6 and 8 include recitals similar to claim 1. For at least reasoning similar to that provided in support of the patentability of claim 1, claims 6 and 8 are patentable over the cited combination of Nagano, Ohta and Wakasugi.

Claim 10 depends from claim 8. For at least reasoning similar to that provided in support of the patentability of claim 8, claim 10 is patentable over the cited combination of Nagano, Ohta and Wakasugi.

For the reasons set forth above, it is submitted that the rejection of claims 6, 8 and 10 under 35 U.S.C. 103(a) as being unpatentable over Nagano and Ohta in view of Wakasugi is overcome. Applicant respectfully requests that the rejection of claims 6, 8 and 10 be reconsidered and withdrawn.

An indication of the allowability of all pending claims by issuance of a Notice of Allowability is earnestly solicited.

Respectfully submitted,

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Paul D. Greeley
Reg. No. 31,019
Attorney for Applicant
Ohlandt, Greeley, Ruggiero & Perle, LLP
One Landmark Square, 10th Floor
Stamford, CT 06901-2682
Tel: (203) 327-4500
Fax: (203) 327-6401